DER Addendum For 28-Day Whole Sediment *Leptocheirus plumulosus* Toxicity Test: (Original Study MRID: 46591501; Amended Report MRID: 48762901)

Amended Report Citation:

Authors: Putt, A.E.

Title: Bifenthrin - Toxicity to Estuarine Amphipods (Leptocheirus plumulosus) During a 28-Day

Sediment Exposure. Amended Final #2 **Study Completion Date**: 15 February 2012

Laboratory: Springborn Smithers Laboratories, 790 Main Street, Wareham, MA 02571-1037

Sponsor: Pyrethroid Working Group, Beveridge & Diamond, 1350 I Street NW

Washington, DC 20005

Laboratory Report ID: 13656.6107

MRID No.: 48762901

Findings:

The original 28-d whole sediment toxicity study of bifenthrin to the estuarine amphipod, *Leptocheirus plumulosus* was classified as supplemental due to the absence of reproduction data (MRID 46591501). The registrant submitted an amended study report which contained the raw and summarized reproduction data (See attached Table 10 from the amended study report). This reviewer analyzed the reproduction data using CETIS v. 1.9.1. According to the Shapiro-Wilk W Normality test, reproduction data conformed to a normal distribution (α =0.01) but variances were not homogeneous among treatments (Bartlett Equality of Variance Test, α =0.01). Therefore, all subsequent statistical analysis relied on nonparametric tests. The solvent and negative control mean # of offspring did not differ statistically. Since the solvent is evaporated from the spiked sand prior to addition to test sediments, a solvent effect would not be expected. Furthermore, due to a significant reduction in amphipod survival at 130 µg ai/kg-dw (mean measured), statistical results for sublethal effects on amphipods in this treatment are considered unreliable due to potential bias in the results for more tolerant individuals.

Data were first analyzed relative to the negative control using the Mann-Whitney U Two-Sample Test and the Jonckheere-Terpstra Step-Down Test. Both tests indicated significant reductions (p<0.05) in mean # offspring/amphipod at 50 μ g ai/kg-dw (nominal), but not at the lower treatments (5.4 and 20 μ g ai/kg-dw) despite a 53% - 62% reduction in offspring relative to negative controls. This low statistical power was likely due in part to the high variance associated with the negative control (CV = 87%) and relatively low sample size (n=5/treatment).

Mean Meas. Conc. μg/kg sed	Control Code	n	Mean # Offspring/ Amphipod	Median	Min	Max	Std Err	CV%	%Effect
0	Neg	5	9.92	5.7	2.2	22.6	3.873	87.31%	0.00%
5.4		5	3.74	3.6	1.8	7.2	0.9958	59.54%	62.30%
20		5	4.64	4.6	1.5	8.2	1.073	51.69%	53.23%
50		5	2.58 *	1.2	1	6.1	0.9957	86.30%	73.99%
130		5	0.52 * ¶	0.4	0.3	1.1	0.1463	62.91%	94.76%

^{*} significantly reduced relative to negative control, Mann-Whitney U and Jonkheere-Terpstra Step Down Test, p<0.05)

In order to increase statistical power, controls were pooled and the data were re-analyzed. Results from both non-parametric tests indicated statistically-significant reductions in mean # of offspring at all treatment levels relative to the pooled control.

[¶] significant reduction in amphipod survival in this treatment.

Mean Meas. Conc. μg/kg sed	Control Code	n	Mean # Offspring/ Amphipod	Median	Min	Max	Std Err	CV%	%Effect
0	Pooled	10	12.05	12.9	2.2	22.6	2.127	55.83%	0.00%
5.4		5	3.74 *	3.6	1.8	7.2	0.9958	59.54%	68.96%
20		5	4.64 *	4.6	1.5	8.2	1.073	51.69%	61.49%
50		5	2.58 *	1.2	1	6.1	0.9957	86.30%	78.59%
130		5	0.52 * ¶	0.4	0.3	1.1	0.1463	62.91%	95.68%

^{*} significantly reduced relative to negative control, Mann-Whitney U and Jonkheere-Terpstra Step Down Test, p<0.05)

Study Conclusions:

In considering these additional reproduction data, the overall (most sensitive) NOAEC and LOAEC values from this study are as follows.

Based on mean measured concentrations in sediment dry weight:

NOAEC: < 5.4 µg ai/kg-dw LOAEC: 5.4 µg ai/kg-dw

Based on mean measured concentrations normalized to sediment organic carbon:

NOAEC: < 132 μg ai/kg-OC LOAEC: 132 μg ai/kg-OC

Based on ESTIMATED¹ concentrations in sediment pore water:

NOAEC: < 0.6 ng ai/L pore water LOAEC: 0.6 ng ai/L pore water

Most sensitive endpoint: amphipod reproduction

Study Classification: This study is considered scientifically sound but is classified as SUPPLEMENTAL and is acceptable for quantitative use in risk assessment.

Rationale: a definitive NOAEC was not reached in this study.

Reparability: none.

Primary Reviewer: Keith G. Sappington, Senior Science Advisor, USEPA/OPP/EFED/ERB5

Signature: Date: 8/10/2016

Secondary Reviewer: Justin Housenger, Biologist, USEPA/OPP/EFED/ERB5

Signature: **Date:** 8/10/2016

[¶] significant reduction in amphipod survival in this treatment.

¹ Pore water concentrations estimated from sediment dry weight concentrations using a mean Koc of 236,800 L/kg-OC and 4.1% sediment TOC.

From the Study Report:

Table 10. Mean percent survival, mean dry weight and mean number of offspring/amphipod at test termination of the 28-day exposure with bifenthrin and amphipods (*Leptocheirus plumulosus*).

Nominal Treatment Level (µg/kg)	Average Percent Survival (SD*)	Average Dry Weight/Amphipod (SD) (mg)	Average Number of Offspring/Amphipod (SD)
Control	94 (3)	2.61 (0.28)	9.91 (8.67)
Solvent Control	95 (5)	2.64 (0.19)	14.17 (3.93)
Pooled Control	95 (4)	2.63 (0.23)	12.04 (6.74)
5.6	98 (4)	1.86 (0.33) ^{bc}	3.73 (2.24) ^e
17	98 (3)	2.76 (0.24)	4.61 (2.40)°
50	96 (7)	2.35 (0.28)	2.57 (2.21)°
150	75 (11) ^e	1.41 (0.17) ^c	0.53 (0.33)°
450	0 (0)°	NA ^d	NA ^d
1350	0 (0) ^c	NA	NA

SD = Standard Deviation.

Statistical reduction not considered biologically relevant due to lack of similar significance at the next two higher treatment levels.

Statistically different (≤ 0.05) compared to the pooled control data.
 NA = Not Applicable.

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OPPTS 850.1780	O Chronic Se	ediment l	_eptocheir	ıs								;	Springbor	n Smither
•	8-1653-7358 19 Jul-16 13:2		Endpoint: Analysis:	Reprodu Nonpara		Two Sa	ımple	e			S Versio		.9.1	
Batch ID: 16	6-7638-8390		Test Type:	Chronic S	Sedime	ent Lept	oche	eirus		Anal	yst: J	Housenger		
Start Date: 03	3 Feb-05		Protocol:	OPPTS 8	350.17	80 Chro	nic S	Sediment L	eptoc	Dilue	ent:			
Ending Date: 03	3 Mar-05	;	Species:	Leptoche	irus pl	umulos	us			Brin	e:			
Duration: 28	8d 0h	;	Source:							Age:				
Sample ID: 09	9-3842-9590		Code:	4659150	1					Clier	nt: E	PA OCSPP EF	ED	
Sample Date: 03	3 Feb-05		Material:	Bifenthrir	1					Proj	ect:			
Receipt Date:		;	Source:	Pyrethroi	d Worl	king Gro	oup							
Sample Age: n/	′a	;	Station:											
Data Transform		Alt H	ур						NOE	EL	LOEL	TOEL	TU	PMSD
Untransformed		C > T							17		50	29.15		50.52%
Mann-Whitney l	J Two-Samp	le Test												
Control vs	Conc-µ	g/kg s	Test	Stat Crit	ical	Ties	DF	P-Type	P-Va	alue	Decisio	on(α:5%)		
Negative Control	5.6		19	n/a		0	8	Exact	0.10	32	Non-Si	gnificant Effect		
	17		16.5	n/a		1	8	Exact	0.22		,	gnificant Effect		
	50*		21	n/a		0	8	Exact	0.04	76	•	ant Effect		
	150*		25	n/a		0	8	Exact	0.00)40	Signific	ant Effect		
ANOVA Table														
Source	Sum Sq	uares	Mean	Square		DF		F Stat	P-Va			on(α:5%)		
Between	246.292		61.57			4		3.391	0.02	285	Signific	ant Effect		
Error	363.168		18.15	84		20		_						
Total	609.46					24								
Distributional To	ests													
Attribute	Test					Test S	Stat	Critical	P-Va	alue	Decisio	on(α:1%)		
Variances	Bartlett E	Equality of	f Variance 1	est		27.13		13.28	1.9E	-05	Unequa	l Variances		
Distr bution	Shapiro-	Wilk W N	ormality Te	st		0.8892	2	0.8877	0.01	07	Normal	Distribution		
Reproduction S	ummary													
Conc-µg/kg sed		Count			LCL	95% L	JCL	Median	Min		Max	Std Err	CV%	%Effect
0	N	5	9.92	-0.8	-	20.67		5.7	2.2		22.6	3.873	87.31%	0.00%
5.6		5	3.74	0.97		6.505		3.6	1.8		7.2	0.9958	59.54%	62.30%
17		5	4.64	1.66		7.618		4.6	1.5		8.2	1.073	51.69%	53.23%
50 150		5 5	2.58 0.52	-0.1 0.11	845	5.344 0.9262	2	1.2 0.4	1 0.3		6.1 1.1	0.9957 0.1463	86.30% 62.91%	73.99%
		J	0.52	0.11	30	0.820		0.4	0.3		1.1	0.1403	02.3170	94.76%
Reproduction D				_	_									
Conc-µg/kg sed ○		Rep 1				Rep 4		Rep 5						
0	N	2.2	4	15.1	I	22.6		5.7						
5.6		4.3	3.6	1.8		1.8		7.2						
17 50		8.2	1.5	4.9		4.6		4						
50		1.1	1	3.5		6.1		1.2						
150		0.3	0.4	0.4		0.4		1.1						

Report Date:

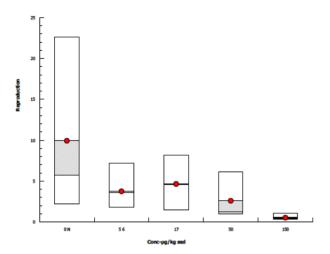
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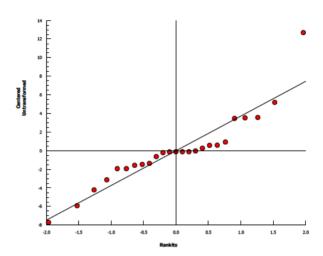
Test Code:

OPPTS 850.1780 Chronic Sediment Leptocheirus

Springborn Smithers

Analysis ID:18-1653-7358Endpoint:ReproductionCETIS Version:CETISv1.9.1Analyzed:19 Jul-16 13:24Analysis:Nonparametric-Two SampleOfficial Results:Yes





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Chronic Sedir	ment Lept	ocheirus								Springbori	n Smithe
		•	•	Control vs (ord Treatm	ents				.9.1	
						CITIO					
							-		J. Housenger		
					Sediment L	eptoc					
	•		eptocheirus pl	umulosus) :			
0h	Sou	rce:					Age:				
3842-9590	Cod	e : 46	5591501				Clien	ıt: E	EPA OCSPP EI	FED	
eb-05	Mate	erial: Bit	fenthrin				Proje	ect:			
	Sou	rce: Py	rethroid Worl	king Group							
	Stat	ion:									
	Alt Hyp					NOE	L	LOEL	TOEL	TU	
	C > T					17		50	29.15		
stra Step-Dow	n Test										
Conc-µg/k	gs	Test Sta	t Critical	Ties	P-Type	P-Va	lue	Decisi	on(α:5%)		
5.6		19	n/a		Exact	0.22	93	Non-S	ignificant Effect		
17		0.7411	1.645	2	Asymp				0		
50*		1.987	1.645	2	Asymp			-			
150*		3.735	1.645	4	Asymp	9.4E	-05	Signifi	cant Effect		
Sum Squar	es	Mean Sq	quare	DF	F Stat	P-Va	lue	Decisi	on(α:5%)		
246.292		61.573		4	3.391	0.02	85	Signific	cant Effect		
363.168		18.1584		20	_						
363.168 609.46		18.1584		20	_						
		18.1584			_						
609.46		18.1584			Critical	P-Va	ılue	Decisi	on(α:1%)		
609.46 ts	ality of Var		t	24	Critical 13.28	P-V a			on(α:1%) al Variances		
609.46 ts Test	-	riance Tesi	t	24 Test Stat			-05	Unequ			
609.46 ts Test Bartlett Equ	-	riance Tesi	t	24 Test Stat 27.13	13.28	1.9E	-05	Unequ	al Variances		
ts Test Bartlett Equ Shapiro-Wil	k W Norm	riance Test ality Test Mean	95% LCL	Test Stat 27.13 0.8892 95% UCL	13.28 0.8877 Median	1.9E 0.01 Min	-05	Unequ Norma	al Variances al Distribution Std Err	CV%	%Effect
ts Test Bartlett Equ Shapiro-Wil mmary Code N	k W Norma	riance Test ality Test Mean 9.92	95% LCL -0.8343	Test Stat 27.13 0.8892 95% UCL 20.67	13.28 0.8877 Median 5.7	1.9E 0.01 Min 2.2	-05	Norma Max 22.6	al Variances Il Distribution Std Err 3.873	87.31%	0.00%
ts Test Bartlett Equ Shapiro-Wil mmary Code N	Count 5 5	riance Test ality Test Mean 9.92 3.74	95% LCL -0.8343 0.9752	7est Stat 27.13 0.8892 95% UCL 20.67 6.505	13.28 0.8877 Median 5.7 3.6	1.9E 0.01 Min 2.2 1.8	-05	Max 22.6 7.2	al Variances al Distribution Std Err 3.873 0.9958	87.31% 59.54%	0.00% 62.30%
ts Test Bartlett Equ Shapiro-Wil mmary Code N	Count 5 5 5	miance Test ality Test Mean 9.92 3.74 4.64	95% LCL -0.8343 0.9752 1.662	7est Stat 27.13 0.8892 95% UCL 20.67 6.505 7.618	13.28 0.8877 Median 5.7 3.6 4.6	1.9E 0.01 Min 2.2 1.8 1.5	-05	Max 22.6 7.2 8.2	al Variances al Distribution Std Err 3.873 0.9958 1.073	87.31% 59.54% 51.69%	0.00% 62.30% 53.23%
ts Test Bartlett Equ Shapiro-Wil mmary Code N	Count 5 5 5 5	Mean 9.92 3.74 4.64 2.58	95% LCL -0.8343 0.9752 1.662 -0.1845	7est Stat 27.13 0.8892 95% UCL 20.67 6.505 7.618 5.344	13.28 0.8877 Median 5.7 3.6 4.6 1.2	1.9E 0.01 Min 2.2 1.8 1.5	-05	Max 22.6 7.2 8.2 6.1	Std Err 3.873 0.9958 1.073 0.9957	87.31% 59.54% 51.69% 86.30%	0.00% 62.30% 53.23% 73.99%
ts Test Bartlett Equ Shapiro-Wil mmary Code N	Count 5 5 5	miance Test ality Test Mean 9.92 3.74 4.64	95% LCL -0.8343 0.9752 1.662	7est Stat 27.13 0.8892 95% UCL 20.67 6.505 7.618	13.28 0.8877 Median 5.7 3.6 4.6	1.9E 0.01 Min 2.2 1.8 1.5	-05	Max 22.6 7.2 8.2	al Variances al Distribution Std Err 3.873 0.9958 1.073	87.31% 59.54% 51.69%	0.00% 62.30%
ts Test Bartlett Equ Shapiro-Wil nmary Code N	Count 5 5 5 5 5 5 5	Mean 9.92 3.74 4.64 2.58 0.52	95% LCL -0.8343 0.9752 1.662 -0.1845 0.1138	7est Stat 27.13 0.8892 95% UCL 20.67 6.505 7.618 5.344 0.9262	13.28 0.8877 Median 5.7 3.6 4.6 1.2 0.4	1.9E 0.01 Min 2.2 1.8 1.5	-05	Max 22.6 7.2 8.2 6.1	Std Err 3.873 0.9958 1.073 0.9957	87.31% 59.54% 51.69% 86.30%	0.00% 62.30% 53.23% 73.99%
ts Test Bartlett Equ Shapiro-Wil mmary Code N ail Code	Count 5 5 5 5 7 7 8 8 7 8 7 8 8 7 8 8 8 8 8 8	Mean 9.92 3.74 4.64 2.58 0.52	95% LCL -0.8343 0.9752 1.662 -0.1845 0.1138 Rep 3	Test Stat 27.13 0.8892 95% UCL 20.67 6.505 7.618 5.344 0.9262 Rep 4	13.28 0.8877 Median 5.7 3.6 4.6 1.2 0.4	1.9E 0.01 Min 2.2 1.8 1.5	-05	Max 22.6 7.2 8.2 6.1	Std Err 3.873 0.9958 1.073 0.9957	87.31% 59.54% 51.69% 86.30%	0.00% 62.30% 53.23% 73.99%
ts Test Bartlett Equ Shapiro-Wil mmary Code N ail Code	Count 5 5 5 5 5 5 6 Rep 1 2.2	Mean 9.92 3.74 4.64 2.58 0.52	95% LCL -0.8343 0.9752 1.662 -0.1845 0.1138 Rep 3	Test Stat 27.13 0.8892 95% UCL 20.67 6.505 7.618 5.344 0.9262 Rep 4 22.6	13.28 0.8877 Median 5.7 3.6 4.6 1.2 0.4 Rep 5	1.9E 0.01 Min 2.2 1.8 1.5	-05	Max 22.6 7.2 8.2 6.1	Std Err 3.873 0.9958 1.073 0.9957	87.31% 59.54% 51.69% 86.30%	0.00% 62.30% 53.23% 73.99%
ts Test Bartlett Equ Shapiro-Will mmary Code N ail Code N	Count 5 5 5 5 7 8 8 7 8 7 8 7 8 7 8 7 8 8 8 8	mean 9.92 3.74 4.64 2.58 0.52 Rep 2 4 3.6	95% LCL -0.8343 0.9752 1.662 -0.1845 0.1138 Rep 3 15.1 1.8	Test Stat 27.13 0.8892 95% UCL 20.67 6.505 7.618 5.344 0.9262 Rep 4 22.6 1.8	13.28 0.8877 Median 5.7 3.6 4.6 1.2 0.4 Rep 5 5.7 7.2	1.9E 0.01 Min 2.2 1.8 1.5	-05	Max 22.6 7.2 8.2 6.1	Std Err 3.873 0.9958 1.073 0.9957	87.31% 59.54% 51.69% 86.30%	0.00% 62.30% 53.23% 73.99%
ts Test Bartlett Equ Shapiro-Will mmary Code N ail Code N	Count 5 5 5 5 5 5 6 Rep 1 2.2	Mean 9.92 3.74 4.64 2.58 0.52	95% LCL -0.8343 0.9752 1.662 -0.1845 0.1138 Rep 3	Test Stat 27.13 0.8892 95% UCL 20.67 6.505 7.618 5.344 0.9262 Rep 4 22.6	13.28 0.8877 Median 5.7 3.6 4.6 1.2 0.4 Rep 5	1.9E 0.01 Min 2.2 1.8 1.5	-05	Max 22.6 7.2 8.2 6.1	Std Err 3.873 0.9958 1.073 0.9957	87.31% 59.54% 51.69% 86.30%	0.00% 62.30% 53.23% 73.99%
ts Test Bartlett Equ Shapiro-Wil mmary Code N	Count 5 5 5 5 7 8 8 7 8 7 8 7 8 7 8 7 8 8 8 8	mean 9.92 3.74 4.64 2.58 0.52 Rep 2 4 3.6	95% LCL -0.8343 0.9752 1.662 -0.1845 0.1138 Rep 3 15.1 1.8	Test Stat 27.13 0.8892 95% UCL 20.67 6.505 7.618 5.344 0.9262 Rep 4 22.6 1.8	13.28 0.8877 Median 5.7 3.6 4.6 1.2 0.4 Rep 5 5.7 7.2	1.9E 0.01 Min 2.2 1.8 1.5	-05	Max 22.6 7.2 8.2 6.1	Std Err 3.873 0.9958 1.073 0.9957	87.31% 59.54% 51.69% 86.30%	0.00% 62.30% 53.23% 73.99%
	-0277-5906 Jul-16 13:24 7638-8390 Feb-05 Mar-05 Oh 3842-9590 Feb-05 Stra Step-Dow Conc-µg/k 5.6 17 50* 150*	-0277-5906 End Jul-16 13:24 Anal 7638-8390 Test Feb-05 Prot Mar-05 Sper Oh Sou 3842-9590 Cod Feb-05 Mate Sou Stat Alt Hyp C > T Stra Step-Down Test Conc-μg/kg s 5.6 17 50* 150* Sum Squares	Jul-16 13:24 Analysis: Note	Conc-μg/kg s Con	Conc-μg/kg s Test Stat Critical Ties	Conc-µg/kg s Test Stat Critical Ties P-Type	Conc-µg/kg s Test Stat Critical Ties P-Type P-Var	CETI	Carriago Carriago	Corroll Cor	Endpoint: Reproduction CETIS Version: CETISV1.9.1

Report Date:

19 Jul-16 13:35 (p 20 of 24)

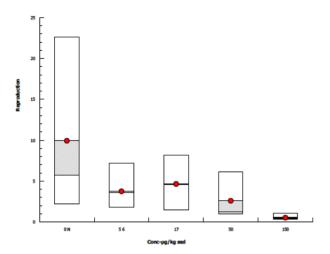
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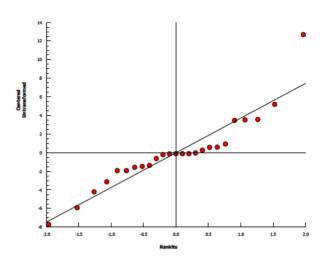
128825_46591501 | 20-3050-4240

OPPTS 850.1780	Chronic Sediment	Leptocheirus
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Springborn Smithers

Analysis ID:	12-0277-5906	Endpoint:	Reproduction	CETIS Version:	CETISv1.9.1
Analyzed:	19 Jul-16 13:24	Analysis:	Nonparametric-Control vs Ord Treatments	Official Results:	Yes





0

5.6

17

50

150

9.6

4.3

8.2

1.1

0.3

20.2

3.6

1.5

0.4

1

12.7

1.8

4.9

3.5

0.4

13.1

1.8

4.6

6.1

0.4

15.3

7.2

4

1.2

1.1

2.2

15.1

22.6

Report Date: Test Code: 19 Jul-16 13:35 (p 21 of 24) 128825_46591501 | 20-3050-4240

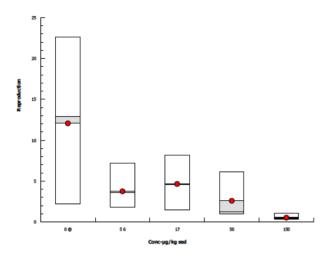
										1621	Code.	120023_40	0091001 20	J-3030-4 <u>2</u> 4
OPPTS 850.178	0 Chroni	c Sedime	nt Leptocheir	us									Springbor	n Smither
Analysis ID: (08-6934-2	2260	Endpoint:	Rep	oroduction					CETI	S Version	: CETISv1	1.9.1	
Analyzed:	19 Jul-16	13:26	Analysis:	Nor	nparametric-	-Two Sa	ample	Э		Offic	ial Results	s: Yes		
Batch ID: 1	6-7638-8	390	Test Type:	Chr	onic Sedime	ent Lep	toche	eirus		Anal	vst: J. l	Housenger		
	3 Feb-05		Protocol:		PTS 850.17				_eptoc					
Ending Date: 0	3 Mar-05		Species:		tocheirus pl					Brine				
•	8d 0h		Source:							Age:				
	9-3842-9	500	Code:	165	91501					Clier		A OCSPP E	FED	
Sample Date: 0		330	Material:		enthrin					Proje		A 00311 L	ILD	
Receipt Date:	3 I C D-03		Source:		ethroid Wor	kina Gr	oun			1 10,0				
Sample Age: n	/a		Station:	ı yı	etiliola vvoi	King Or	oup							
· ·														
Data Transform			Hyp						NO	EL	LOEL	TOEL	TU	PMSD
Untransformed		C >	> 1						< 5.6		5.6	n/a		34.92%
Mann-Whitney I	J Two-Sa	ample Tes	st											
Control vs	Coı	ntrol II	Test	Stat	Critical	Ties	DF	P-Type	P-V	alue	Decision	η(α:5%)		
Pooled Controls	5.6	•	44		n/a	0	13		0.00		Significa			
	17*		41.5		n/a	1		Exact	0.02		Significa			
	50*		46		n/a	0	13		0.00		Significa			
	150	*	50		n/a	0	13	Exact	3.3E	E-04	Significa	nt Effect		
ANOVA Table														
Source	Sum	Squares	Mear	Squ	ıare	DF		F Stat	P-V	alue	Decision	η(α:5%)		
Between	609.	298	152.3	324		4		8.096	2.5E	E-04	Significa	nt Effect		
Error	470.	365	18.81	46		25		_						
Total	1079	9.66				29								
Distributional T	ests													
Attribute	Test					Test S	Stat	Critical	P-V	alue	Decision	η(α:1%)		
Variances	Bart	ett Equalit	y of Variance	Test		25.88		13.28	3.4E	-05	Unequal	Variances		
Distr bution			V Normality Te			0.925	7	0.9031	0.03	378	Normal D	Distribution		
Reproduction S	ummary													
Conc-µg/kg sed	l Cod	e Co	unt Mear	1	95% LCL	95% l	JCL	Median	Min		Max	Std Err	CV%	%Effect
0	@	10	12.05	,	7.238	16.86		12.9	2.2		22.6	2.127	55.83%	0.00%
5.6		5	3.74		0.9752	6.505		3.6	1.8		7.2	0.9958	59.54%	68.96%
17		5	4.64		1.662	7.618		4.6	1.5		8.2	1.073	51.69%	61.49%
50		5	2.58		-0.1845	5.344		1.2	1		6.1	0.9957	86.30%	78.59%
150		5	0.52		0.1138	0.926	2	0.4	0.3		1.1	0.1463	62.91%	95.68%
Reproduction D	etail													
Conc-µg/kg sed	l Cod	e Re	p1 Rep	2	Rep 3	Rep 4	ļ	Rep 5	Rep	6	Rep 7	Rep 8	Rep 9	Rep 10
														

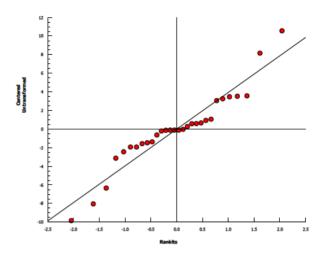
Report Date: Test Code: 19 Jul-16 13:35 (p 22 of 24) 128825_46591501 | 20-3050-4240

OPPTS 850.1780 Chronic Sediment Leptocheirus

Springborn Smithers

Analysis ID:08-6934-2260Endpoint:ReproductionCETIS Version:CETISv1.9.1Analyzed:19 Jul-16 13:26Analysis:Nonparametric-Two SampleOfficial Results:Yes





Report Date: 19 Jul-16 13:35 (p 23 of 24)

Test Code:	128825_46591501 20-3050-4240

								1631	oouc.	120020_40	0001001 20	7 3030 727
OPPTS 850.1780	Chronic Sec	diment Lep	otocheirus								Springbor	n Smithers
Analysis ID: 15	5-7656-2784	En	dpoint: F	Reproduction				CET	IS Versior	n: CETISv	1.9.1	
Analyzed: 19	9 Jul-16 13:26	6 An	alysis: N	Nonparametric-	-Control vs (Ord. Treatr	nents	Offic	ial Result	s: Yes		
Batch ID: 16	-7638-8390	Te	st Type: (Chronic Sedimo	ent Leptoch	eirus		Anal	yst: J.	Housenger		
Start Date: 03	Feb-05	Pro	otocol:	OPPTS 850.17	80 Chronic	Sediment I	_eptoc	Dilu	ent:			
Ending Date: 03	Mar-05	Sp	ecies: L	eptocheirus pl	lumulosus			Brin	e:			
Duration: 28	d 0h	So	urce:					Age	:			
Sample ID: 09	-3842-9590	Co	de : 4	6591501				Clie	nt: EF	PA OCSPP E	FED	
Sample Date: 03	Feb-05	Ма	terial: E	Bifenthrin				Proj	ect:			
Receipt Date:		So	urce: F	Pyrethroid Wor	king Group							
Sample Age: n/a	a	Sta	ation:									
Data Transform		Alt Hyp					NO	EL	LOEL	TOEL	TU	
Untransformed		C > T					< 5.6		5.6	n/a		
Jonckheere-Terp	stra Step-Do	wn Test										
Control vs	Control I	ll .	Test St	at Critical	Ties	P-Type	P-V	alue	Decisio	n(α:5%)		
Pooled Controls	5.6*		44	n/a		Exact	0.00	97	Significa	ant Effect		
	17*		2.277	1.645	2	Asymp	0.01		J	int Effect		
	50*		3.292	1.645	2	Asymp	5.0E		J	ant Effect		
	150*		4.718	1.645	4	Asymp	1.2E	E-06	Significa	nt Effect		
ANOVA Table												
Source	Sum Squ	ares	Mean S	quare	DF	F Stat	P-V	alue	Decisio	n(α:5%)		
Between	609.298		152.324		4	8.096	2.5E	E-04	Significa	int Effect		
Error	470.365		18.8146	3	25	_						
Total	1079.66				29							
Distributional Te	sts											
Attribute	Test				Test Stat	Critical	P-V	alue	Decisio			
Variances			ariance Te		25.88	13.28	3.4E			Variances		
Distr bution	Shapiro-W	/ilk W Norr	mality Test		0.9257	0.9031	0.03	378	Normal I	Distribution		
Reproduction Su	ımmary											
Conc-µg/kg sed	Code	Count	Mean	95% LCL		Median	Min		Max	Std Err	CV%	%Effect
) - 0	@	10	12.05	7.238	16.86	12.9	2.2		22.6	2.127	55.83%	0.00%
5.6 17		5 5	3.74	0.9752	6.505	3.6	1.8		7.2	0.9958	59.54%	68.96%
17 50		5 5	4.64 2.58	1.662 -0.1845	7.618 5.344	4.6 1.2	1.5 1		8.2 6.1	1.073 0.9957	51.69% 86.30%	61.49% 78.59%
150		5	0.52	0.1138	0.9262	0.4	0.3		1.1	0.9937	62.91%	95.68%
Reproduction De	etail		-									
Conc-µg/kg sed	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep	6	Rep 7	Rep 8	Rep 9	Rep 10
0	@	9.6	20.2	12.7	13.1	15.3	2.2		4	15.1	22.6	5.7
5.6		4.3	3.6	1.8	1.8	7.2						
17		8.2	1.5	4.9	4.6	4						
50		1.1	1	3.5	6.1	1.2						
150		0.3	0.4	0.4	0.4	1.1						
			- •	-	-							

OPPTS 850.1780 Chronic Sediment Leptocheirus

Report Date:

19 Jul-16 13:36 (p 24 of 24) 128825_46591501 | 20-3050-4240

Test Code:

Springborn Smithers

Analysis ID: 15-7656-2784 Endpoint: Reproduction CETIS Version: CETISv1.9.1

Analyzed: 19 Jul-16 13:26 Analysis: Nonparametric-Control vs Ord. Treatments Official Results: Yes

